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ABSTRACT

A 9-year-old autistic boy with language comprehension skills but minimal meaningful expressive language was exposed to a language training program. The program began with imitation of sounds and progressed to discrimination training, responding to his name, and partial verbalization. Positive reinforcement (including food and a revolving light) was supplied throughout the program. The S's spontaneous verbalizations to picture card stimuli increased dramatically during treatment, with additional evidence of improved verbal clarity. Difficulties with misbehavior and use of food reinforcement were noted. Training effects did not generalize to other settings. (CL)

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Kaoru Yamaguchi

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The Application of Behavior Analysis to the Development of Language in an Autistic Child

Kaoru Yamaguchi

November 1980

The Research Institute for the Education of Exceptional Children

Tokyo Gakugei University

Koganei, Tokyo, Japan

THE APPLICATION OF BEHAVIOR ANALYSIS TO THE DEVELOPMENT OF LANGUAGE IN AN AUTISTIC CHILD

Kaoru Yamaguchi
The Research Institute for the Education of Exceptional Children
Tokyo Gakugei University

I Objective

Autistic children are noted to be poor in social and verbal language skills when given psychological tests. One of the most important points is language retardation and distortion. This study was undertaken to apply the behavior analysis to produce verbalization in a child who had language comprehension but did not say anything.

II Subject

Boy, born April 1971. No abnormalities at birth. At around 2 years of age he began to stop answering to his name but no hearing abnormality was found. He was diagnosed as autistic by the Tokyo Child Guidance Center in October, 1975. He attended a nursery for handicapped children until May, 1976 when he started going to a regular kindergarten. Some of his behavior characteristics included being dissatisfied if he could not always close the door by himself, or panicking if someone else touched the light switch he turned on. He had absolutely no interest in any of the people around him except for those some relation to him. When he wanted something, he grabed the hand of the person and brought them to the place he wanted. He had a habit of holding the pointer finger and middle finger of his right had in front of his face, the two fingers stuck close together. He liked moving around, playing with sand and water, the trampoline, lining up blocks and climbing to high places. He said things like "ooh", "joh", "appapa", etc. with weired noises, but he seemed to understand some things when you observe his pointing behavior. He could also follow his teachers instructions to a fair degree.

However, he disliked being restricted and often showed negativistic behavior.

III Results of the Previous Study

Object: To develop shape discrimination on the pegboard, puzzle-ball, etc. and to establish a good attitude toward studying by facing toward the desk for a specified period of time.

Time: December 1975 - June, 1976

Results are shown in Figure 1.

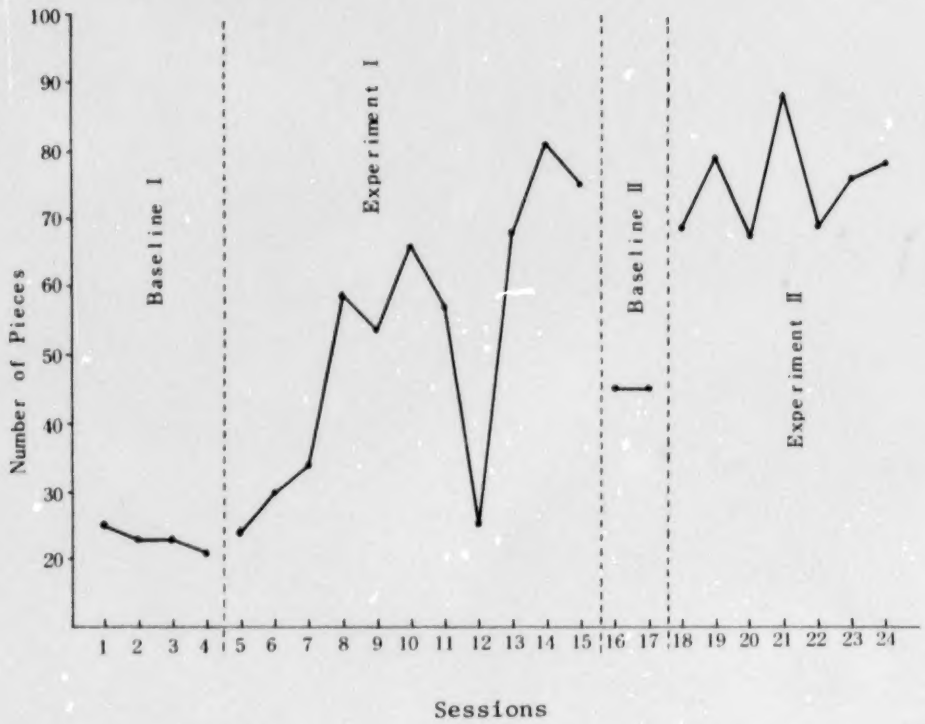

Fig.1 Results of Puzzleball Training

Discussion: He showed a fairly ideal change in behavior from Baseline 1, Experiment 1, to Baseline 2, Experiment 2. In particular, the number of incidences of his searching for complicated shapes on the puzzle ball and putting the correct piece was increased.

IV Behavioral Observations

Object: To find out what verbalizations and behavior occur during free play and snack time.

Time: May, 1976, for one month.

1) Observations during free play: He spent most of his time in the sand box, followed by the trampoline, lining up blocks and other actions. We decided to observe mainly his play in the sandbox. He makes continual weird noises and meaningless sounds over and over while digging in the sand. When given two shovels by the teacher and asked for one, he hands over a shovel. He showed a relatively good motor response to instructions.

2) Snack time: When we asked him to say "please" for pudding or other snacks, he held out his hands in request. When he was in a good mood he pointed out a picture of pudding in a book when asked "where is the pudding?". He also started responding more to "where is your mouth?" etc. by bringing his hand to his mouth. By the end of the training period for verbal imitation, he was saying "go-" (partial verbalization) for "gochisosama" (thank you) at the end of snack time when asked to say "gochisosama".

3) Observations when the teacher changed the stimulus situation

a) when the teacher gave verbal stimulation while playing with the child,

b) when the teacher did not give verbal stimulation while playing with the child,

c) when the child was playing alone.

The child was observed during each of the above 3 situations two times each for five minutes each during play in the sandbox. There was absolutely no change in his behavior.

V The Present Study

1) Object: to try to establish verbal language by training since the child showed a relatively good motor response to language stimulation, although he had no meaningful verbalizations.

2) Procedure

a) Experimental Stage 1 (Training in imitation of sounds)

i) Training in the sound "ah" which occurs frequently in the child's everyday vocalizations.

ii) Training time - once a week for 10 minutes.

iii) Method - the child sat in a chair facing the teacher. The teacher called the child's name and when he looked at his face, the teacher said "ah". If he imitated the sound, he was given a reinforcer.

iv) Stimulus and reinforcement - the teacher said "ah" every ten seconds. The child was reinforced immediately.

v) Reinforcers - one piece of chocolate given at the same time as the verbal reinforcement "very good".

vi) Imitation training: reinforcement given for either opening his mouth, making some sound, or saying "ah" in Stage 1. The child was prompted by touching a finger to his lips.

In Stage 2, the child was reinforced only for making some kind of sound. The same prompting was used as in Stage 1.

In Stage 3, the child was reinforced only for saying "ah". No prompting was used.

b) Experimental Stage 2 (Language training using picture cards)

i) Goal: The child was already saying "ah" from Stage 1, and saying "cho-" (for "chodai" (please)) and "ake-" (for "akete" (open it)) during free play. He also was able to point his finger at a picture in a book when asked, for example, "where is the ice cream?". The goal of this stage was to proceed in steps using verbal imitation training to where the child would answer by himself in his own words the question "what is this?".

ii) Training situation - two teachers and the child sat at a desk in an observation room 24 meters square as Figure 2.

iii) Training period - two times a week, 15 minutes each.

iv) Recording - a) tape record the whole session

b) note taking by an observer on a special rating sheet.

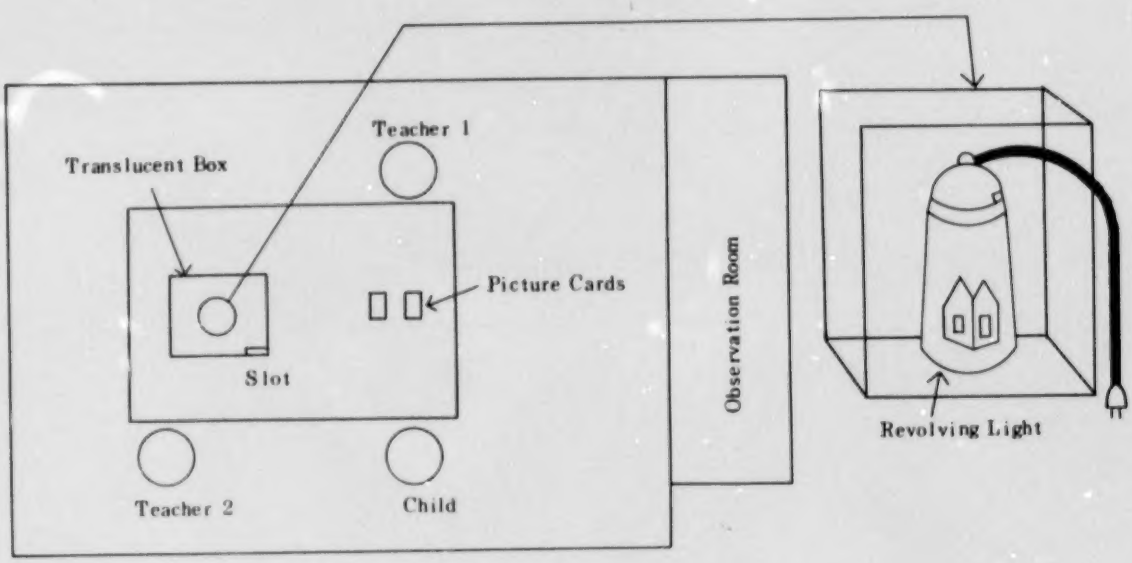

Fig.2 Study Room

Both methods were combined for final judgments..

v) Method of reinforcement

Positive reinforcement: a) turning on a colorful revolving light when the child chose the correct card and put it in the box, b) crackers or juice when the child made verbalizations to stimuli, c) verbal reinforcement - a little when the child chose the correct card and put it in the box, and a lot when the child made a verbalization.

Time out: The lights in the room were turned off if the child left his seat and were kept off until he returned to his seat.

vi) Procedures of training

a) Discrimination between cards - two cards were lined up and the teacher would ask "which one is the clock?" (stimulus). The child would pick the correct card and put it in the box (reinforcement).

b) Verbal imitation of the card - the teacher would present a card and say "what's this? A clock." This was repeated

over and over. If the child said "clock" he was rewarded a lot, and if he just putted it in the box he was rewarded a little.

c) Verbalization of the card - the teacher would present a card of clock and say "what's this?" The child was reinforced only if he said "clock".

The above training occurred in steps from a to b to c.

vii) Categorizing correct responses

a) Correct verbalization of the word. For example, saying "book" when a book was shown.

b) Partial verbalization of the word - if one part of the word was said. The decision was based on a combination of the tape recording and observer's notes as well as a third persons's judgment of the tape recording. Sounds which clearly had meaning related to the word were considered correct. For example, "ri-" for "ringo" (apple).

3) Results

By the sixth session, the child responded to his name by saying "ah". By the 10th session, he said "ah" 63% of the time and opened his mouth 88.9% of the time. In the 13th and 14th sessions he did not want to enter the room and often left his chair. The experiment was then stopped and we proceeded to Experimental Stage 2. The results of the Experimental Stage 1 is shown in Figure 3.

Especially notable about his language progress was his correct pointing out of picture book, clock, etc. during free play in response to questions as to where they were and in general, his ability to throw back a ball properly. In the 12th session, if you let him hold the can of juice and said "say 'akete' (open it)", he would say "ake-" (partial verbalization).

There were about 40 cards altogether. The teacher would line up 2 cards and would tell the child to pick one of them and put it in the box. He put most of the cards into the box as instructed. He showed more imitative speech from the first session in response to questions like "which one is the apple?". In the middle of the 2nd session he started crying, so from the 5th session on we changed the conditions

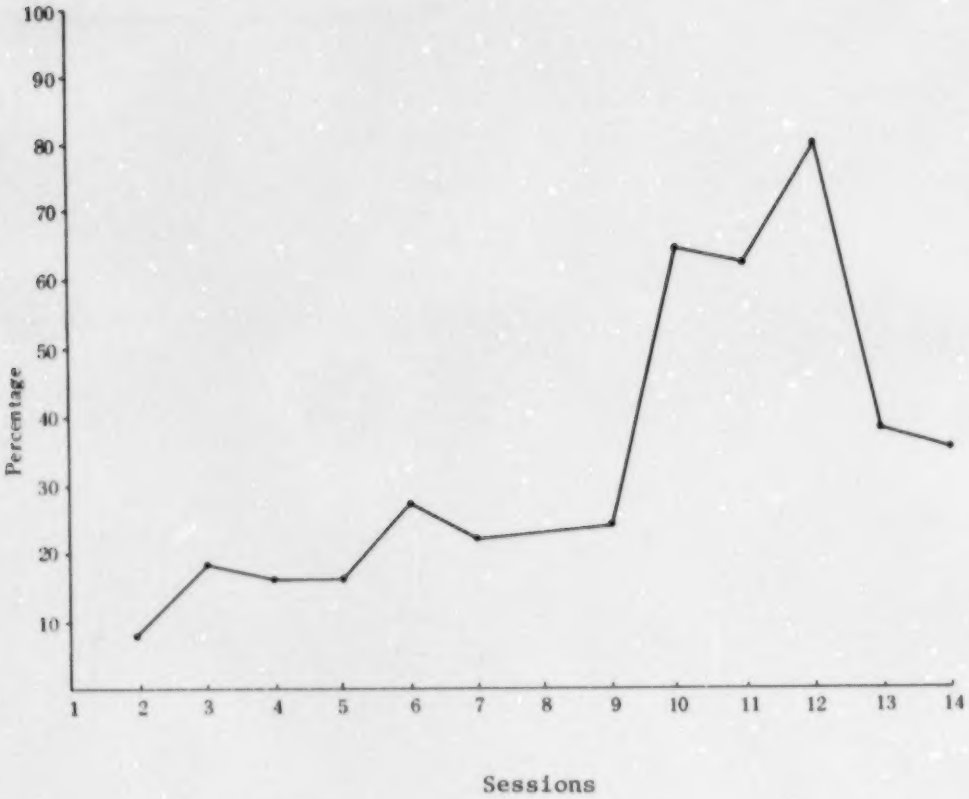

Fig. 3 Imitation Rate of "ah"
(July 6, 1976 - Oct. 9, 1976 14 sessions)

of the experiment.

a) the place where the teacher sat was changed. The teacher sat so he faced the child and their eyes could meet. Up until this point, they were seated to guard against the child leaving his seat.

b) the number of cards was reduced from 40 to 30, and the number presented in each session was adjusted so each card could be presented twice.

c) the cards were presented one at a time and the child's name was called to get his attention. Then the teacher would slowly give the verbal stimulus "clock". The revolving light was turned on only if the child produced an imitative sound and food reinforcement was

given. The card was not handed over to the child if he did not make a sound.

Although the above methods were tried, from the 5th session on, negativistic responses worsened and he would make strange noises, refuse to study and leave his seat. Since the card was not handed over if he didn't make a sound, he would say something strange like "keee" and stand up. So from the 5th session, procedure 3 was stopped and we returned to the discrimination task of lining up two cards. From the 7th session, "time out" was introduced. The room was darkened whenever the child left his seat. Since the child could turn on the lights by himself however, light bulbs were installed and the second teacher controlled the switch. The cards were presented by saying "what is this? Boat.". From the 11th session, spontaneous verbalizations appeared, and the number of his verbalizations to the question "what is this?" increased. In the 24th session, the number of spontaneous verbalizations reached 70%. After that, the increase in spontaneous verbalizations continued to increase. Although food reinforcement was presented intermittently and the use of the revolving light as a reinforcement was stopped from April on, by the end of May, his spontaneous verbalizations were close to 90%. (Fig. 4)

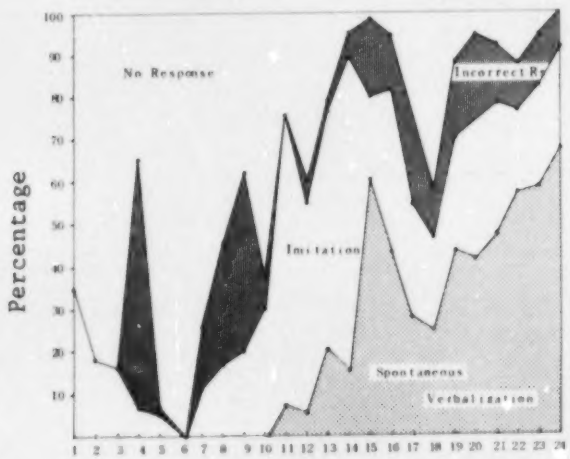

Fig.4 Rate of Verbalization
(Oct. 16, 1976 - March 12, 1977 24 sessions)

His actual verbalizations in February were as follows:

Cards	Verbalizations	Cards	Verbalizations	Cards	Vervalizations
Hikôki (Aeroplane)	Hiko Hikokî	Memo (Peach)	Mo Memo	Ringo (Apple)	Ri -ngo
Jidosha (Car)	Jido Jî	Ashi (Foot)	A Ai	Hon (Book)	Hon
Kasa (Umbrella)	Ka Kasu	Tomato (Tomato)	To	Denki Light)	Êki De
Fusen (Baloon)	Fu Futsen	Pan (Bread)	Pan	Denwa (Telephone)	Den Dena
Neko (Cat)	Ko Neko	Tokei (Watch)	To Toke	Saru (Monkey)	Sau Saru
Ame (Candy)	Âme	Banana (Banana)	Bâ	Koppu (Cup)	-ppu
Te (Hand)	Te	Ki (Tree)	Ki	Fune (Ship)	Fu
Aisu (Ice cream)	Â Asu	Kuri (Chestnut)	Ku	Uma (Horse)	Ma

VI Discussion

The child's spontaneous verbalizations to picture card stimuli increased dramatically during the course of the experiment. There was also evidence of a considerable improvement in the clarity of verbalizations between early and late stages of the experiment.

From our experience in training this autistic child, the first thing we would like to talk about is how there is no way of predicting when or what kind of misbehavior will occur. According to Lovaas, it is necessary to scold or spank the child for the sake of future training, but we did not use this method. If you want to cure misbehavior, you should be able to use punishment, and since we wanted to encourage even better behavior in this child, we used extinction as a means of dealing with misbehavior. At the same time, we felt that the child's misbehavior might also be a reflection of problems with task presentation or the progression of the task. Thus we cannot make a judgment as the whether Lovaas' method is preferable or not.

Stage 1 of this experiment (training in imitation of sounds) may have been too simple for this child. It seems as though a task which included motor activity might have been better.

We would now like to talk about the problem of reinforcement. In Stage 1, we used chocolate and ice cream, and in Stage 2, crackers, juice and the revolving light as reinforcers. But it is very difficult to choose the most appropriate reinforcer, especially because the child has no language. The chocolate used in Stage 1 is a favorite of the child, but in the middle of the experiment he would stick the chocolate in between his teeth about half the time. Ice cream was very effective, but since the child would not always enter the study room right away, the ice cream often completely melted. The crackers and juice were the most acceptable. The revolving light was used for a while, and although the colors and turning attracted his attention, its effectiveness as a reinforcer is not clear. Since the effectiveness of food reinforcers depends on the degree of food deprivation of the subject, it is necessary to have the cooperation of the parents.

From the beginning of May, food reinforcers were stopped, then the use of the revolving light, and the second teacher removed from the room. By the end of May, use of the box was stopped and the experiment was continued with the teacher and child facing each other on either side of a desk with social reinforcement only. Then we proceeded to the next task using the same reinforcers as this study again.

The most difficult problem in training of this child was stimulus generalization. We changed the teacher. The child continued to study successfully as far as the study was done in the same room. However, this verbal behavior was not generalized appropriately in his daily life. Our next task will be to make an appropriate program for him to generalize his verbal behavior in the study room into his daily life.

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